**[4910-13]**

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 29**

**[Docket No.FAA-2017-1128; Notice No. 29-045-SC]**

# Special Conditions: Bell Helicopter Textron, Inc. (BHTI), Model 525 Helicopters; Control Margin Awareness

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed special conditions.

**SUMMARY:** This action proposes special conditions for the BHTI Model 525 helicopter. This helicopter will have a novel or unusual design feature associated with the fly-by-wire flight control system (FBW FCS) in the area of pilot awareness of the control margins remaining while maneuvering the helicopter. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These proposed special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

**DATES:** Send your comments on or before **[insert a date 45 days after date of publication in the Federal Register].**

**ADDRESSES:** Send comments identified by docket number [FAA-2017-1128] using any of the following methods:

- Federal eRegulations Portal: Go to http://www.regulations.gov and follow the online instructions for sending your comments electronically.

- Mail: Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE., Room W12-140, West Building Ground Floor, Washington, D.C., 20590-0001.
- Hand Delivery of Courier: Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, S.E., Washington, D.C., between 8 a.m., and 5 p.m., Monday through Friday, except Federal holidays.
- Fax: Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to http://www.regulations.gov, including any personal information the commenter provides. Using the search function of the docket website, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal Register published on April 11, 2000 (65 FR 19477-19478), as well as at http://DocketsInfo.dot.gov.

Docket: Background documents or comments received may be read at http://www.regulations.gov at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, D.C., between 9 a.m., and 5 p.m., Monday through Friday, except Federal holidays.

**FOR FURTHER INFORMATION CONTACT:** George Harrum, Aerospace Engineer, FAA, Rotorcraft Standards Branch, Policy and Innovation Division, 10101 Hillwood Pkwy, Fort Worth, TX 76177; telephone (817) 222-4087; email George.Harrum@faa.gov.

**SUPPLEMENTARY INFORMATION:**

**Comments Invited**

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

We will consider all comments we receive on or before the closing date for comments. We will consider comments filed late if it is possible to do so without incurring expense or delay. We may change these special conditions based on the comments we receive.

**Background**

On December 15, 2011, BHTI applied for a type certificate for a new transport category helicopter designated as the Model 525. The Model 525 is a medium twin-engine rotorcraft. The design maximum takeoff weight is 20,500 pounds, with a maximum capacity of 19 passengers and a crew of 2.

The BHTI Model 525 helicopter will be equipped with a four-axis full authority digital FBW FCS that provides for aircraft control through pilot input and coupled flight director modes. The current 14 CFR part 29 regulations do not contain adequate standards for FBW FCS with respect to control margin awareness. The airworthiness standards for controllability and maneuverability of the rotorcraft are contained in § 29.143. These controllability requirements are compatible with most FBW systems, while most of the maneuverability requirements are not affected by FBW systems, except for the control margins. One of the purposes of the rule is to ensure that control margins (at the rotor and the anti-torque system level) are sufficient in the defined flight envelope to avoid loss of control (that is, the rotorcraft has adequate control power

for the pilot to exit potentially hazardous flight conditions). Implicit in this purpose is that the pilot is provided with sufficient awareness of proximity to control limits. Because § 29.143 was written to address hydro-mechanical flight control systems, through which pilot awareness of control margins is provided by cyclic and pedal position relative to cockpit control stops, the rule is inadequate for certification of a FBW FCS, where there is no mechanical link between the inceptor and the receptor. Without a constant correlation between cockpit control and main or tail rotor actuator positions, the FCS may not provide tactile control margin feedback to the pilot through cockpit control position relative to the control position physical stop or limit, for all flight conditions. The proposed special conditions will require the minimum safety standard to ensure awareness of proximity to control limits at the main rotor and tail rotor is provided to pilots of the Bell Model 525 helicopter.

**Type Certification Basis**

Under the provisions of 14 CFR 21.17, BHTI must show that the Model 525 helicopter meets the applicable provisions of part 29, as amended by Amendment 29-1 through 29-55 thereto. The BHTI Model 525 certification basis date is December 31, 2013, the effective date of application to the FAA.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 29) do not contain adequate or appropriate safety standards for the BHTI Model 525 because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates

the same or similar novel or unusual design feature, the special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the BHTI Model 525 helicopter must comply with the noise certification requirements of 14 CFR part 36, and the FAA must issue a finding of regulatory adequacy under section 611 of Public Law 92-574, the "Noise Control Act of 1972."

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

**Novel or Unusual Design Features**

The BHTI Model 525 helicopter will incorporate the following novel or unusual design features: a four-axis full authority digital FBW FCS. Pilot control inputs, through the mechanically linked cockpit controls (cyclic, collective, directional pedals), are transmitted electrically to each of the three Flight Control Computers (FCCs). The pilot control input signals are then processed and transmitted to the hydraulic flight control actuators which affect control of the main and tail rotors.

**Discussion**

The proposed special condition will require the minimum safety standard to ensure awareness of proximity to control limits at the main rotor and tail rotor is provided to pilots of the Bell Model 525 helicopter. The system design must provide the pilot with sufficient awareness of proximity to control limits, traditionally achieved through conventional flight controls by the pilot’s inherent awareness of cyclic stick and pedal position relative to control stops.

**Applicability**

As discussed above, these special conditions are applicable to the BHTI Model 525 helicopter. Should BHTI apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

**Conclusion**

This action affects only certain novel or unusual design features on one model of rotorcraft. It is not a rule of general applicability.

**List of Subjects in 14 CFR Part 29**

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

**The Proposed Special Conditions**

Accordingly, the Federal Aviation Administration (FAA) proposes the following special conditions as part of the type certification basis for Bell Helicopter Textron, Inc., Model 525 helicopters:

Control Margin Awareness.

In addition to the existing § 29.143 requirements, the following special condition applies: The system design must ensure that the flight crew is made suitably aware whenever the means of primary flight control approaches the limits of control authority. For the context of this special condition, the term "suitable" indicates an appropriate balance between nuisance and necessary operation.

Issued in Ft Worth, Texas on May 24, 2018.

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